

Research Team

Physics of Magnetic Materials

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Team members

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Research Direction

The research of the team is oriented in the field of magnetic materials. Soft magnetic materials prepared by rapid quenching from the melt are dominant materials studied. Effects of preparation conditions, chemical composition and treatment of these materials on their basic magnetic characteristics are main topics of the research. Special attention is paid to topical issues such as GMI effect and single domain wall dynamics.

The Importance and Benefits of Research

Generally research activities of the team can be considered as basic research in the field of magnetic properties of soft magnetic materials. The main characteristic feature of this team, which makes it slightly different from other teams working in this field, is concentration on the development of new not traditional experimental procedures for the study of soft magnetic materials.

Current Research

Topics dealing with single domain wall dynamics in cylindrical amorphous ferromagnetic microwires are in the centre of interest of the team. Dynamics of domain wall between circular domains and also domain wall between axial domains is studied. Recently it has been discovered by the team that domain wall velocity in the so called bistable FeSiB glass coated microwire can depend on orientation of magnetization to which the microwire is magnetized by the wall movement. This effect was given the name “unidirectional effect” in the wall propagation. Interpretation of this effect is not clear and for this reason a lot of current team research activities is oriented to the search of appropriate interpretation.

Current Projects

VEGA

- Dynamics of magnetization processes in amorphous ferromagnetic materials (2015-2017)
- Modification of structure and selected magnetic properties of amorphous ferromagnetic materials (2012-2014)
- Structure of amorphous ferromagnetic materials and their selected magnetic properties (2010-2011)

APVV

- Domain wall dynamics in thin magnetic wires. (2012-2015)

Cooperation with Academic Institutions and Industry

Institute of Physics, Faculty of Science, Pavol Jozef Šafárik University in Košice

Institute of Experimental Physics, Slovak Academy of Sciences, Košice

Selected Publication

- M. Kladiťová, J. Ziman Influence of the Hall effect on domain wall mobility in a cylindrical sample with circumferential easy axis *Physica Status Solidi (b)*. Vol. 246, no. 10 (2009), p. 2341-2345. - ISSN 0370-1972
- J. Ziman, J. Onufer, M. Kladiťová Domain wall dynamics and Hall effect in eddy current loop in amorphous ferromagnetic wire with small helical anisotropy *Physica B: Condensed Matter*. Vol. 406, no. 19 (2011), p. 3576–3582. - ISSN 0921-4526
- J. Onufer, J. Ziman, M. Kladiťová Dynamics of closure domain structure in bistable ferromagnetic microwire *Journal of Magnetism and Magnetic Materials*. No. 344 (2013), p. 148–151. - ISSN 0304-8853
- J. Ziman, M. Kladiťová, V. Šuhajová Impedance and domain wall mass determination in cylindrical wire with circular anisotropy *Journal of Magnetism and Magnetic Materials*. Vol. 393 (2015), p. 363-369. - ISSN 0304-8853
- J. Ziman, V. Šuhajová, M. Kladiťová Effect of domain structure on the impedance of ferromagnetic wire with circumferential anisotropy *Sensors and Actuators A-Physical*. Vol. 223 (2015), p. 134-140. - ISSN 0924-4247
- J. Onufer, J. Ziman, M. Kladiťová Unidirectional effect in domain wall propagation observed in bistable glass-coated microwire *Journal of Magnetism and Magnetic Materials*. Vol. 396 (2015), p. 313-317. - ISSN 0304-8853